eastern Iowa, and damaging frost was reported in various parts of Missouri. Frost also occurred at points in Missouri on the 5th, 7th, 14th, and 16th. On the 7th frost killed fruit blossoms, early fruit, and foliage in Decatur and Osborne counties, Kansas. On the 8th frost damaged young vegetables in northern Alabama. On the 9th frost caused considerable damage to tender vegetation in Middlesex, Monmouth, Burlington, Morris, and Sussex counties, New Jersey. On the 11th a severe frost occurred in Michigan; clover and young fruits were damaged, and wheat was reported injured. On the 12th and 15th frost killed tender vegetation in northern North Dakota. On the 14th and 16th frost was very destructive to fruit and garden vegetables in Buchanan county, Missouri, and on the latter-named date frost injured vegetables in western Indian Territory, and Montgomery county, Kansas. On the 21st and 29th frost killed bean and cucumber vines in Multnomah county, Oregon, and the frosts of the last three days of the month severely injured vines and garden vegetables in Morrow and Malheur counties, Oregon.

The southern limit of frost for the month is indicated by a line traced from the coast of east-central Virginia northward to south-central Pennsylvania, thence west of south to central Georgia, thence north of west to northern Mississippi, thence northward to southern Illinois, thence irregularly westward to east-central Arizona, and thence northwestward to central Nevada. On the Pacific coast frost was reported as far south as Jolon, Cal., on the 1st, and at Pasadena, Cal., on the 11th. Compared with the preceding month the southern limit of frost for May, 1890, was about six degrees farther north on the Atlantic coast, one to three degrees farther north in the east Gulf states, about seven degrees farther north in the Mississippi Valley, about six degrees farther north on the eastern slope of the Rocky Mountains, about three degrees farther north in the plateau region, while on the Pacific coast the southern limit of frost was about the same for each month. As compared with the average dates of last killing frost in the respective regions the frost of the 11th in Ohio was about three weeks late, the frost of the 6th in Iowa was about one week late, the frost of the 8th in Alabama was about seven weeks late, the frost of the 9th in New Jersey was three to four weeks late, the frost of the 11th in lower Michigan was nearly two weeks late, the frost of the 15th in North Dakota was seasonable, the frost of the 16th in Missouri and Indian Territory was about one month late, the frost of the 16th in Kansas was about three weeks late, and the frost of the last three days of the month in Oregon was about two weeks late.

TEMPERATURE OF WATER.

The following table shows the maximum, minimum, and mean water temperature as observed at the harbors of the several stations; the monthly range of water temperature; and the mean temperature of the air for May, 1890:

Stations.	Temperature at bottom.				Mean temperature of air at the station.
	Max.	Min.	Range.	Monthly mean.	
	°	°	°	°	°
Boston, Mass	57.3	49.2	8.1	52.5	57.0
Canby, Fort, Wash					
Charleston, S. C	77.8	70.0	7.8	74.6	73.0
Eastport, Me	45.1	39.5	5.6	41.7	47.9
Galveston, Tex	82.0	73.5	8.5	77.4	75.0
Key West, Fla	85.3	79.2	6.1	82.7	78.8
Portland, Oregon	60.0	51.9	8.1	55.7	60.6

PRECIPITATION (expressed in inches and hundredths).

The distribution of precipitation over the United States and Canada for May, 1890, as determined from the reports of nearly 2,000 stations, is exhibited on chart iii. In the table of miscellaneous meteorological data the total precipitation and the departure from the normal are given for each Signal Service station. The figures opposite the names of the geographical districts in the columns for precipitation and departure from the normal show, respectively, the averages for the several districts. The normal for any district may be found by adding the departure to the current mean when the precipitation is below the normal and subtracting when above.

The heaviest precipitation reported for May, 1890, was 16.19, at Hypoluxo, Fla., and the precipitation exceeded 15.00 at Titusville, Fla. Over 14.00 was reported at Caddo Creek, central Texas, over 12.00 in east-central Pennsylvania, over 11.00 in central and southeastern Louisiana and northwestern South Carolina, and over 10.00 in central Alabama, central Georgia, south-central Indiana, central and south-central Maine, and northwestern Pennsylvania. Over a greater part of Arizona, and in southeastern California, southern Nevada, southwestern Colorado, eastern Utah, southwestern New Mexico, and extreme western Texas no precipitation was reported, and in central Washington, western Oregon, northeastern lower Idaho, east-central Wyoming, western Kansas, south-central North Dakota, north-central South Dakota, and south-central Wisconsin less than one-half inch of precipitation fell.

The precipitation was generally in excess of the normal east of the Mississippi River, and from the middle Pacific coast northeastward over the northern plateau region and a part of the northeastern slope of the Rocky Mountains. In the interior of the country from Manitoba southward to the Rio Grande Valley and southwestward to the south Pacific coast the precipitation was deficient. The greatest departures above the normal precipitation occurred from central Alabama southeastward over northeastern Florida, where they exceeded six inches, and at stations on the south shores of Lakes Ontario and Erie, the excess was more than three inches. The most marked deficiencies in precipitation were noted from central Wyoming eastward to north-central Nebraska, and in the Panhandle of Texas, where they exceeded three inches, and over a large part of the middle-eastern and southeastern slopes of the Rocky Mountains, and on the north Pacific coast in adjoining parts of Washington and Oregon the deficiency was more than two inches. Considered by districts the average percentages of the normal in districts where the precipitation was in excess were about as follows: middle Pacific coast, 261 per cent.; lower lake region, 170 per cent.; northern plateau region, 155 per cent.; east Gulf states, 143 per cent.; south Atlantic states, 135 per cent.; middle Atlantic states, 133 per cent.; New England, 132 per cent.; upper lake region, 118 per cent.; Ohio Valley and Tennessee, 108 per cent.; Key West, Fla., 107 per cent.; and upper Mississippi valley, 102 per cent. In districts where the precipitation was deficient the percentages of the normal were about as follows: southern plateau region, 5 per cent.; south Pacific coast, 15 per cent.; northeastern and middle-eastern slopes of the Rocky Mountains, 45 per cent.; north Pacific coast, 46 per cent.; extreme northwest, 49 per cent.; middle plateau region, 51 per cent.; Missouri Valley, 63 per cent.; Rio Grande Valley, 83 per cent.; southeastern slope of the Rocky Mountains, 90 per cent.; and west Gulf states, 96 per cent.

The table of miscellaneous meteorological data for regular stations of the Signal Service and the table of deviations from the normal precipitation for certain stations, as reported by voluntary observers, show that at the following-named places the precipitation for the current month was the heaviest ever reported for May during the respective periods of observation: Albany, N. Y.; Atlantic City, N. J.; Jacksonville, Fla.; Erie, Pa.; Merritt's Island, Fla.; Forsyth, Ga.; Cumberland, Md.; Newburyport and Somerset, Mass.; Thornville, Mich.; Coopers-

town, N. Y.; Dyberry, Pa.; and Strafford, Vt. At Moorhead, Minn., Fort Yates, N. Dak., Fort Washakie, Wyo., Concordia, Kans., Fort Stanton, N. Mex. (no rainfall), Santa Fe, N. Mex., Fort Bowie, Ariz., and Eola, Oregon, the precipitation was the least ever reported for May; and at Lava, N. Mex., Fort Thomas, Whipple Barracks (Prescott), San Carlos, Wilcox, and Yuma, Ariz., no precipitation was reported, and no precipitation occurred in May of two or more preceding years.

In May of preceding years the heaviest precipitation was generally reported in the lower Rio Grande valley in 1885; in the Ohio Valley and Tennessee in 1882; in the lower lake region in 1883; and on the north Pacific coast in 1879 or 1887, and the least precipitation for May was generally reported in New England in 1887; in the west Gulf states and on the middle-eastern and southeastern slopes of the Rocky Mountains in 1886; in the lower lake region in 1877; in the northern plateau region in 1881; and on the north Pacific coast in 1888; elsewhere the periods of occurrence of greatest and least precipitation for May were irregular. An entire absence of precipitation at a majority of stations in the southern plateau region is common in May.

For the period January to May, 1890, inclusive, the precipitation in the Ohio Valley and Tennessee, in the lower lake region, over the southeastern slope of the Rocky Mountains, and on the middle Pacific coast averaged more than one-fourth greater than the normal, while in the south Atlantic and east Gulf states, at Key West, Fla., in the extreme northwest, in the Missouri Valley, over the northeastern and middle-eastern slopes of the Rocky Mountains, and on the south Pacific coast it averaged two to three-fourths of the normal amount for the period named.

DEVIATIONS FROM AVERAGE PRECIPITATION.

The following table shows for certain stations, as reported by voluntary observers, (1) the average precipitation for May for a series of years; (2) the length of record during which the observations have been taken and from which the average has been computed; (3) the total precipitation for May, 1890; (4) the departure of the current month from the average; (5) and the extreme monthly precipitation for May during the period of observation and the years of occurrence:

State and station.	County.	(1) Average for the month of May.	(2) Length of record.	(3) Total for May, 1890.	(4) Departure from average.	(5) Extreme monthly precipitation for May.			
						Greatest.		Least.	
						Am't.	Year.	Am't.	Year.
Arkansas.		*Inches*	*Years*	*Inches*	*Inches.*	*Inches*		*Inches.*	
Lead Hill	Boone	6.66	8	4.08	−2.58	10.56	1882	2.04	1886
California.									
Sacramento	Sacramento	0.73	40	2.10	+1.37	3.65	1889	0.00	*
Connecticut.									
Middletown	Middlesex	3.79	28	5.51	+1.72	7.63	1868	0.22	1887
Florida.									
Merritt's Island	Brevard	3.67	13	11.58	+7.91	11.58	1890	0.88	1886
Georgia.									
Forsyth	Monroe	2.92	16	7.31	+4.39	7.31	1890	0.45	1877
Illinois.									
Peoria	Peoria	3.79	34	2.74	−1.05	10.73	1858	0.93	1879
Riley	McHenry	3.79	39	4.33	+0.54	15.46	1851	0.54	1870
Indiana.									
Logansport	Cass	4.87	17	8.32	+3.45	11.13	1858	2.09	1881
Vevay	Switzerland	3.91	25	4.37	+0.46	11.80	1865	0.52	1874
Iowa.									
Cresco	Howard	3.51	18	4.73	+1.22	7.89	1880	0.76	1874
Monticello	Jones	3.60	35	4.48	+0.88	7.97	1858	0.76	1874
Logan	Harrison	4.41	24	6.29	+1.88	11.00	1877	1.10	1874
Kansas.									
Lawrence	Douglas	4.25	24	5.14	+0.89	8.27	1889	1.12	1887
Wellington	Sumner	4.74	11	2.97	−1.77	9.37	1881	0.88	1886
Louisiana.									
Grand Coteau	St. Landry	5.82	7	3.57	−2.25	14.03	1884	0.21	1889
Maine.									
Gardiner	Penobscot	3.70	51	7.84	+4.14	11.76	1850	0.36	1852
Maryland.									
Cumberland	Allegany	3.05	18	7.13	+4.08	7.13	1890	0.30	1875
Massachusetts.									
Newburyport	Essex	3.71	11	6.08	+2.37	6.08	1890	.....	.....
Somerset	Bristol	3.59	17	5.81	+2.22	5.81	1890	1.08	1880
Michigan.									
Kalamazoo	Kalamazoo	4.10	14	4.66	+0.56	6.38	1883	1.44	1885
Thornville	Lapeer	3.39	13	5.87	+2.48	5.87	1890	1.37	1881

Deviations from average precipitation—Continued.

State and station.	County.	(1) Average for the month of May.	(2) Length of record.	(3) Total for May, 1890.	(4) Departure from average.	(5) Extreme monthly precipitation for May.			
						Greatest.		Least.	
						Am't.	Year.	Am't.	Year
Minnesota.		*Inches*	*Years*	*Inches*	*Inches.*	*Inches*		*Inches.*	
Minneapolis	Hennepin	3.44	24	4.16	+0.72	6.21	1879, '88	0.07	1866
Montana.									
Fort Shaw	Lewis&Clarke	1.98	20	1.85	−0.13	7.19	1876	0.36	1872
New Hampshire.									
Hanover	Grafton	3.16	44	5.40	+2.24	7.37	1850	0.55	1852
New Jersey.									
Moorestown	Burlington	3.91	26	2.77	−1.14	7.38	1867	0.65	1880
South Orange	Essex	3.04	19	4.62	+1.58	6.46	1888	0.41	1880
New York.									
Cooperstown	Otsego	3.31	36	8.84	+5.53	8.84	1890	0.36	1879
Palermo	Oswego	2.62	36	4.75	+2.13	6.90	1867	0.30	1870
North Carolina.									
Lenoir	Caldwell	4.75	18	4.70	−0.05	11.50	1873	1.60	†
Ohio.									
N. Lewisburgh	Champaign	3.75	18	4.70	+0.95	7.95	1882	1.55	1879
Wauseon	Fulton	4.18	18	4.78	+0.60	8.22	1889	1.14	1877
Oregon.									
Albany	Linn	2.80	13	0.39	−2.41	5.70	1879	0.39	1884
Eola	Polk	1.99	20	0.26	−1.73	5.94	1879	0.26	1890
Pennsylvania.									
Dyberry	Wayne	2.92	20	5.56	+2.64	5.56	1890	0.36	1875
Grampian Hills	Clearfield	4.21	18	6.77	+2.56	11.60	1889	1.58	1866
Wellsborough	Tioga	5.13	11	7.85	+2.72	9.36	1884	1.51	1886
South Carolina.									
Statesburgh	Sumter	3.60	9	6.13	+2.53	6.68	1888	1.24	1882
Tennessee.									
Austin	Wilson	3.33	22	5.97	+2.64	8.40	1882	1.44	1877
Milan	Gibson	3.29	7	3.99	+0.70	4.98	1884	1.90	1888
Texas.									
New Ulm	Austin	2.66	17	4.07	+1.41	12.25	1884	0.05	1886
Vermont.									
Strafford	Orange	3.00	17	7.60	+4.60	7.60	1890	0.40	1877
Virginia.									
Birdsnest	Northampton	3.64	21	7.05	+3.41	7.85	1885	0.50	1879
Wisconsin.									
Madison	Dane	3.63	22	5.03	+1.40	8.39	1858	1.09	1870
Washington.									
Fort Townsend	Jefferson	2.00	16	0.94	−1.06	7.81	1875	0.61	1888

*1857, 1873, and 1885; †1881 and 1883.

EXCESSIVE PRECIPITATION.

Monthly precipitation to equal or exceed ten inches was reported at ten stations in Florida; at three stations in Louisiana and Maine; at two stations in Pennsylvania and Georgia; and at one station in Alabama, Indiana, South Carolina, and Texas; the heaviest monthly precipitation, 16.19, being reported at Hypoluxo, Fla.

In May of preceding years monthly precipitation to equal or exceed ten inches has been reported for sixteen years in Texas; for fourteen years in Kansas; for ten years in Iowa; for from five to nine years, inclusive, in Maine, New York, Pennsylvania, Virginia, North Carolina, Georgia, Florida, Mississippi, Louisiana, Arkansas, Illinois, Indiana, Missouri, and Nebraska; and for from one to four years, inclusive, in New Hampshire, Connecticut, Rhode Island, New Jersey, Delaware, South Carolina, Alabama, Tennessee, Maryland, District of Columbia, Indian Territory, Minnesota, Wisconsin, Kentucky, Michigan, the Dakotas, Colorado, Montana, California, and Washington. In states and territories other than those named, precipitation to equal or exceed ten inches has not been reported for May of preceding years. The following are more notable monthly rainfalls reported for May of preceding years: 34.85, at Melissa, Tex., in 1881, and 21.95 in 1873; 19.85, at Northport, Mich., in 1884; 19.40, at Hudson, N. Y., in 1876.

Precipitation to equal or exceed 2.50 inches in twenty-four hours was reported at thirteen stations in Georgia, and on five dates, the 15th, 25th, 26th, 27th, and 29th; at eleven stations in Florida, and on ten dates, the 4th to 7th, 15th, 16th, and 27th to 30th; at ten stations in Pennsylvania, and on eight dates, the 10th, 18th, 19th, 20th, 22d, 23d, 25th, and 26th; at nine stations in South Carolina, and on three dates, the 25th, 26th, and 27th; at eight stations in Louisiana, and on four dates, the 2d, 3d, 13th, and 24th; at eight stations in Texas, and on seven dates, the 1st 2d, 4th, 11th, 13th, 24th, and 25th; at seven stations in Iowa, and on four dates, the 9th, 10th, 22d, and 31st; at five stations in Illinois, and on three dates, the 9th, 10th, and 22d; at five stations in Kansas, and on two

dates, the 30th and 31st; at five stations in Michigan, and on two dates, the 9th and 10th; at four stations in Missouri, and on three dates, the 23d, 24th, and 30th; at three stations in Alabama, and on four dates, the 5th, 11th, 26th, and 27th; at three stations in Indiana, and on three dates, the 4th, 10th, and 12th; at three stations in Mississippi, and on two dates, the 2d and 3d; at three stations in North Carolina, and on two dates, the 26th and 27th; at three stations in Ohio, and on two dates, the 9th and 10th; at three stations in Virginia, and on three dates, the 24th, 26th, and 27th; at two stations in Wisconsin, and on two dates, the 9th and 10th; and at one station in Arkansas, on the 16th. Among the heavier rainfalls reported for this period were: 5.28, at Fort Deposit, Ala., 26–27th; 6.89, at Hypoluxo, Fla., 29-30th; 6.08, at Live Oak, Fla., 4–5th; 5.20, at Luling, La., 24th; 5.00, at Columbia, La., 13th; 5.07, at Lumberton, N. C., 26–27th; 6.02, at Simpsonville, S. C., 25–26th; 5.05, at Caddo Peak, Tex., 1st.

In May of preceding years precipitation to equal or exceed 2.50 inches in twenty-four hours has been reported for ten or more years in the lower Missouri and upper Mississippi valleys, in Texas, Louisiana, and along the south Atlantic coast; in Florida, the east Gulf states, the Dakotas, Colorado, Tennessee, Michigan, Maryland, and Pennsylvania for from five to nine years; and in Maine, Massachusetts, New York, Connecticut, Rhode Island, New Jersey, Delaware, Virginia, Kentucky, Ohio, Indiana, Minnesota, Wisconsin, and Montana for from one to four years. Over the plateau region and along the Pacific coast, except in California in 1889, rainfall to equal or exceed 2.50 inches in twenty-four hours has not been reported for May of preceding years. Among the heavier rainfalls reported for this period in May of preceding years are: 5.25, at Frederick, Md., 31st, 1889; 6.00, at West Almond, N. Y., 31st, 1889; over five inches at a number of stations in Pennsylvania May 31st, 1889, the greatest amount being 6.71 at Charlesville; 9.92, at Columbus, Ga., 22d, 1880; 9.28, at Durham, Ark., 1st, 1876; 7.60, at Austin, Tex., 30th, 1870; 7.50, at Okolona, Miss., 4th, 1887; 7.37, at Shreveport, La., 6th, 1876; and 9.00, at New Frankford, Mo., 28–29th, 1889.

Precipitation to equal or exceed one inch in one hour was reported at six stations in Texas, and on five dates, the 1st, 5th, 6th, 24th, and 25th; at five stations in Pennsylvania, and on three dates, the 13th, 19th, and 25th; at four stations in Louisiana, and on four dates, the 2d, 4th, 5th, and 25th; at three stations in Iowa, and on two dates, the 22d and 31st; at three stations in Mississippi, and on four dates, the 2d, 3d, 12th, and 19th; at three stations in Missouri, and on three dates, the 18th, 30th, and 31st; at two stations in Illinois, and on two dates, the 3d and 12th; at two stations in North Carolina, and on two dates, the 15th and 26th; at two stations in Tennessee, and on two dates, the 10th and 13th; at one station in Alabama on the 3d; at Jupiter, Fla., on the 6th, 28th, 29th, and 30th; at one station in Georgia on the 26th; at one station in Kansas on the 29th; at one station in Maryland on the 25th; at one station in Ohio on the 10th; at one station in South Carolina on the 13th; and in Virginia on the 24th. Among the heavier rainfalls reported for this period were: 1.60 in twenty-two minutes, at Savannah, Ga., on the 26th; 3.90 in one hour, at McCausland, Iowa, on the 22d; 1.00 in twenty minutes, at Offerle, Kans., on the 29th; 1.69 in twenty minutes and 1.75 in thirty-eight minutes, at Cumberland, Md., on the 25th; 1.60 in twenty-two minutes at Charlotte, N. C., on the 26th, and 3.00 in one hour, at Bolar, Va., on the 24th.

In May of preceding years precipitation to equal or exceed one inch in one hour has been reported for fourteen years in Kansas; for twelve years in Texas; for from five to ten years in Florida, North Carolina, South Carolina, Georgia, Missouri, Tennessee, Ohio, Nebraska, and Iowa; and for from one to four years in Massachusetts, Vermont, Connecticut, New York, Pennsylvania, Maryland, Virginia, Alabama, Mississippi, Arkansas, Louisiana, Indian Territory, Kentucky, Indiana, Illinois, Michigan, Wisconsin, the Dakotas, Colorado, Minnesota, Montana, and California. Among the heavier rainfalls reported for this period in May of preceding years are: 1.70 in twelve minutes, at Collinsville, Ill., 23d, 1888; 2.30 in fifteen minutes, at Embarrass, Wis., 28th, 1881; 0.50 in ten minutes, at Davenport, Iowa, 3d, 1888; 1.50 in twenty minutes, at Fort Riley, Kans., 14th, 1885; 1.50 in twenty minutes, at West Leavenworth, Kans., 13th, 1886; 1.50 in five minutes and 2.25 in forty minutes, at Fort McPherson, Nebr., 27th, 1868; 1.15 in ten minutes, at New York City, 22d, 1881; 1.10 in fifteen minutes, at Toledo, Ohio, 20th, 1880; 2.38 in thirty minutes, at College Hill, Ohio, 27th, 1888; 1.20 in ten minutes, at Mount Ida, Ark., 10th, 1882; 1.10 in fifteen minutes, at Dale Enterprise, Va., 12th, 1889; and 1.64 in twenty minutes, at Mobile, Ala., 5th, 1879.

Table of excessive precipitation, May, 1890.

State and station.	Monthly rainfall 10 inches, or more.	Rainfall 2.50 inches, or more, in 24 hours.		Rainfall of 1 inch or more, in one hour.		
		Amt.	Day.	Amt.	Time.	Day.
Alabama.	*Inches.*	*Inches.*		*Inches*	*h. m.*	
Eufaula		3.50	11			
Fort Deposit		5.28	26–27			
Montgomery	10.19	3.54	5	1.15	0 55	3
Arkansas.						
Winslow		2.51	16			
Florida.						
Alva		3.01	28			
Archer	10.53	3.16	27			
Fort Meade		2.50	7			
Hypoluxo	16.19	6.89	29–30			
Jacksonville		3.71	28–29			
Jupiter	13.51	2.90	6	1.15	1 00	6
Do		4.85	28–29	1.35	0 50	6
Do				1.00	1 00	28
Do				1.93	1 00	29
Do				1.40	1 00	30
Lake City		4.74	4			
Live Oak	11.99	6.08	4–5			
Do		3.50	30			
Madison	12.72					
Merritt's Island	11.58	2.90	29			
Micco	10.19					
Saint Francis Barracks	10.71					
Tallahassee	12.36	4.20	4			
Titusville	15.14	3.84	15–16			
Do		3.86	28–29			
Georgia.						
Athens (1)		2.88	25–26			
Athens (2)	10.48	4.19	26			
Atlanta		3.90	25–26			
Columbus		3.27	26			
Eastman	10.54	2.52	15			
Forsyth		2.82	26–27			
Fort McPherson		3.84	25–26			
Louisville		3.36	27			
Marietta		3.15	25			
Quitman (2)		2.55	29			
Savannah		3.03	25–26	1.60	0 22	26
Way Cross		3.09	29			
Waynesborough		2.85	27			
Illinois.						
Belvidere		3.10	9–10			
Cairo				1.65	1 15	3
Chicago		2.60	9–10			
Dwight		3.05	•22			
Rockford		2.50	9			
Springfield				1.08	1 00	12
Winnebago		3.00	9–10			
Indiana.						
Crandall	10.62	2.60	4			
Do		2.64	10			
Worthington		2.63	12			
Iowa.						
Blakeville		3.00	9			
Davenport				1.50	0 50	22
Dubuque		2.60	9–10			
Independence		2.70	9			
Le Claire		3.91	22			
Logan		3.13	31	3.13	1 20	31
McCausland		3.90	22	3.90	1 00	22
Webster City		2.50	9			
Kansas.						
Globe		4.20	30–31			
Lebo		3.65	30–31			
Morse		3.10	31			
Offerle				1.00	0 20	29
Ottawa		3.75	30–31			
Yates Centre		3.03	30–31			
Louisiana.						
Baton Rouge				2.10	2 00	25
Columbia	11.00	5.00	13			
Farmerville		3.02	3			
Girard		2.93	13			
Houma		2.59	2	2.00	1 00	5
Lake Charles		2.50	2	2.50	1 30	2
Luling	11.54	5.20	24			
Marksville				1.25	0 45	4
Maurepas		2.60	24			
Sugar Experiment Station	10.19					

Table of excessive precipitation—Continued.

State and station.	Monthly rainfall 10 inches, or more.	Rainfall 2.50 inches, or more, in 24 hours.		Rainfall of 1 inch, or more, in one hour.		
		Amt.	Day.	Amt.	Time.	Day.
Maine.	*Inches.*	*Inches.*		*Inches*	*h. m.*	
Bar Harbor	10.81					
Mayfield	10.29					
Orono	10.52					
Maryland.						
Cumberland (1)				1.69	0 20	25
Cumberland (2)				1.75	0 38	25
Fallston		3.00	25-26			
Michigan.						
Berrien Springs		2.86	9-10			
Cassopolis		3.44	9-10			
Jonesville		2.90	9-10			
Parkville		2.56	9-10			
Paw Paw		2.90	9-10			
Mississippi.						
Edwards		3.60	3			
Louisville				1.05	1 00	19
Meridian				1.18	1 00	12
Vicksburg		3.25	2-3	1.20	1 00	2
Do				1.00	1 00	3
Waynesborough		2.65	3			
Missouri.						
Adrian		2.91	30			
Appleton City		3.20	30			
Carthage		3.16	24			
Eldon		2.50	23			
Kansas City				1.24	1 08	30
Princeton				2.00	1 45	31
Saint Louis				2.23	0 50	18
North Carolina.						
Charlotte		3.03	26-27	1.60	0 22	26
Lumberton		5.07	26-27			
Wadesborough		2.55	26-27			
Wilmington				1.50	1 00	15
Ohio.						
Bellevue		2.81	9-10			
Orangeville		2.60	9-10	1.50	1 30	10
Tiffin		2.78	9-10			
Pennsylvania.						
Aqueduct	10.38	4,69	19			
Blooming Grove		2,60	19-20			
Catawissa		2.51	18-19			
Corry		2.77	22-23			
Franklin		3.02	10			
Gettysburgh		2.53	20			
Girardville	12.41					
Harrisburg		3.05	19-20	1.05	1 00	19
Hollidaysburgh				1.20	0 30	25
Lewistown				1.20	1 00	13
Mauch Chunk				1.07	0 45	19
Myerstown		2.66	25-26			
Pottsdam		2.60	26			
Wilkes Barre		3.21	19-20			
York				1.40	0 50	13
South Carolina.						
Blackville		3.40	27			
Evergreen		3.30	26			
Hardeeville				1.15	1 00	13
Kingstree		3.04	27			
Saint Matthews		3.29	27			
Simpsonville	11.61	6.02	25-26			
Spartanburgh (1)		4.50	27			
Spartanburgh (2)		3.00	25-26			
Statesburgh		3.56	26-27			
Trial		3.95	27			
Tennessee.						
Covington				1.20	0 30	10
Grief				1.00	1 00	13
Texas.						
Brady				1.04	0 55	1
Brazoria		3.05	24-25			
Brownsville				1.73	1 10	25
Caddo Peak	14.28	5.05	1			
Do		3,67	4			
Do		3.36	11			
Camp Peña Colorado				1.10	0 25	5
Columbia		3.95	25			
Corpus Christi				1.12	0 53	25
Dallas (2)		2.50	25			
Fort Brown				1.01	1 00	6
Galveston		2.87	24-25	1.46	1 00	5
Do				2.01	1 00	24
Longview		4.00	13			
Palestine		3.04	1			
Waco		2.70	2			
Virginia.						
Bolar		3.00	24	3.00	1 00	24
Fort Monroe		3.58	26-27			
Smithfield		3.65	26-27			
Wisconsin.						
Honey Creek		2.90	9			
Potosi		3.68	9-10			

Received too late for general discussion of weather, May, 1890.

State and station.	Monthly rainfall 10 inches, or more.	Rainfall 2.50 inches, or more, in 24 hours.		Rainfall of 1 inch, or more, in one hour.		
		Amt.	Day.	Amt.	Time.	Day.
Georgia.						
Diamond	11.60	3.00	19			

Received too late for publication in April Review.

State and station.	Monthly rainfall 10 inches, or more.	Rainfall 2.50 inches, or more, in 24 hours.		Rainfall of 1 inch, or more, in one hour.		
		Amt.	Day.	Amt.	Time.	Day.
Colony Surinam, S. A.						
Burnside-Coronie	11.44	4.15	9			
Do		3.29	18			
Colorado.						
Longmont		3.10	23			

MAXIMUM RAINFALLS IN ONE HOUR OR LESS.

The following table is a record of the heaviest rainfalls during May, 1890, for periods of five and ten minutes and one hour, as reported by regular stations of the Signal Service furnished with self-registering gauges:

Station.	Maximum fall in—					
	5 min.	Date.	10 min.	Date.	1 hour.	Date.
	Inch.		*Inch.*		*Inch.*	
Bismarck, N. Dak*						
Boston, Mass	c.06	14	0.11	14	0.33	6
Buffalo, N. Y	0.18	3	0.25	3	0.40	3
Cincinnati, Ohio	0.22	13	0.30	13	0.40	13
Chicago, Ill †						
Cleveland, Ohio †						
Denver, Colo	0.05	22	0.05	22	0.20	22
Detroit, Mich	0.10	10	0.15	10	0.25	9, 25
Duluth, Minn	0.05	29	0.08	29	0.30	29
Galveston, Tex	0.43	5	0.83	5	2.01	24
Jupiter, Fla	0.35	4	0.65	10	1.93	29
Marquette, Mich*						
New York City	0.18	1	0.35	1	0.40	1
New Orleans, La	0.30	19	0.39	19	0.58	1
Norfolk, Va	0.20	6	0.28	6	0.55	27
Philadelphia, Pa	0.15	20	0.20	20	0.33	20
Savannah, Ga	0.35	3	0.40	3	0.60	3
San Francisco, Cal	0.03	10	0.05	10	0.15	10
Saint Louis, Mo	0,25	18	0.50	18	‡	
Saint Paul, Minn	0,03	23	0.07	23	0.25	23
Washington City	0.20	20	0.35	20	0.50	20

* Not sufficient for gauge to record. † Register out of order. ‡ Record incomplete.

SNOW (snowfall in inches and tenths).

The greatest depth of snowfall was reported in west-central Colorado, where it exceeded ten inches. In extreme eastern upper Michigan more than eight inches fell; in south-central Minnesota and east-central Nevada five inches; over the northern part of upper Michigan, northwestern Minnesota, southeastern South Dakota, and north-central Wyoming more than four inches; generally over upper Michigan, northern Wisconsin, northern, western, and southern Minnesota, central Montana, northeastern Colorado, and central Nevada more than three inches. No snow was reported in the Atlantic coast states, save trace in northern New Hampshire, and at Kendall, western New York. In the Ohio and Mississippi valleys and on the eastern slope of the Rocky Mountains trace of snowfall was reported to the fortieth parallel; and in the plateau region to north-central New Mexico. No snow was reported in the Pacific coast states, save in Lassen county, California.

Snowfall was reported as follows: *California.*—Susanville, 1. *Colorado.*—Ranch, near Como, 10.8; Fort Collins, 8; Le Roy, 3.6; Wray and Yuma, 3; Box Elder, 2.5; Crook, Georgetown, and Watervale, 2; Abbott, 1.7; Cumbres, 1; Sunnyside, 0.5; Colorado Springs, trace. *Illinois.*—Lake Forest, trace. *Indiana.*—Angola, Farmland, and Point Isabel, trace. *Iowa.*—Amana, 1; Bancroft, Blakeville, Des Moines, Indianola, and Keokuk, trace. *Kansas.*—Allison, trace. *Michigan.*—Fort Brady, 8.6; Calumet, 6.5; Marquette, 5.6; Sault de Ste. Marie, 4.9; Atlantic, 4; Lathrop, 3.8; Crystal Falls, 3; Cheboygan, 1.7; Alpena, 0.7; Fort Mackinac, 0.5; Mottville, 0.1; Bear Lake, Gladwin, Grand Pass, Gulliver Lake, Harrison, and Ivan, trace. *Minnesota.*—Mankato, 5; Saint Vincent, 4.5; Le Seuer, 4; Duluth, 3.8; Montevideo, 3.6; Red Wing, 3.5; Moorhead, 3.4; Northfield and Sheldon, 3; Tracy, 3; Minneapolis, 2.5; Fort Ripley and Saint Paul, 2; Pine River Dam

and Rolling Green, 1; Morris, 0.8; Farmington, 0.4; Medford, trace. *Montana.*—Fort Maginnis, 3.4; Fort Custer, 0.1; Helena and Virginia City, trace. *Nebraska.*—Alliance and Hay Springs, trace. *Nevada.*—Ruby Hill, 5; Austin, 3.2; Palisade, 0.5. *New Hampshire.*—West Milan, trace. *New Mexico.*—Chama, trace. *New York.*—Kendall, trace. *North Dakota.*—Fort Pembina, 3.4; Fort A. Lincoln, 3; Fort Buford, 2.6; Fort Totten, 2.2; Davenport and Grand Forks, 1.5; Fort Yates, 1.2; Bismarck, 0.5. *Ohio.*—Wauseon, 1.1; Bangorville, Canton, and Weymouth, trace. *South Dakota.*—Clark and Fort Meade, 4; Brookings, 3.5; Rapid City, 2.5; Wolsey, trace. *Wisconsin.*—Phillips, 3.2; Embarrass, 2.5; Neillsville, 1; Lincoln, 0.2; Delavan, Greenwood, and Milwaukee, trace. *Wyoming.*—Fort McKinney, 4; Owen, 3; Cheyenne, 1; Fort Bridger and Fort Washakie, trace.

No reports of snow on the ground at the close of the month have been received.

HAIL.

Description of the more severe hail storms of the month are given under the heading "Local storms." Hail was reported as follows: 1st, Ky., Md., N. J., Pa., Tenn., Tex. 2d, Colo., Pa., S. Dak., Tenn. 3d, Ind. T., Ky., La., Mich., N. Y., S. Dak., Tex. 4th, Ga., Kans., La., Minn., N. Mex., Tex., Va., Wyo. 5th, Ark., Colo., Iowa, La., Mich., Nebr., N. Y., Ohio, Oregon, S. Dak., Tex. 6th, Cal., Iowa, Ky., Mich., Minn., Mo., Nebr., Nev., Ohio, S. Dak., Tenn. 7th, Ky., Mich., Nev., Ohio, Tenn., Va. 8th, Colo., Mo., Nebr., Va., Wyo. 9th, Colo., Iowa, Mo., Nebr., Nev., Tex., Wash., Wis. 10th, Cal., Ill., Ind., Mich., Nev., N. Mex., N. Y., Ohio, Tenn. 11th, Minn., Nebr., Tex., Wyo. 12th, Colo., Ill., Ind., Iowa, Minn., Miss., Mo., Nebr. 13th, N. Y., N. C., Pa., Tex., Va. 14th, Mass., N. J., Pa., S. C., Va. 15th, Mass., Nebr., S. C., Tex. 16th, Me., Mass., N. Mex., N. Y., Va., Wis. 17th, Kans., Nebr., N. H., N. Y., S. Dak. 18th, Colo., Fla., Ga., Ill., Ind., Iowa, Mo., Nebr., N. H., N. Y., S. Dak., Tex. 19th, N. C., Pa., S. C., Tenn., Tex., W. Va. 20th, Kans., S. Dak., Va. 21st, Nebr. 22d, Colo., Ill., Iowa, Kans., Mo., Nebr., N. Mex. 23d, Colo., Ill., Kans., La., Mo., Nebr., N. Mex., Ohio, Pa. 24th, Colo., Ill., Ind. T., Iowa, Mich., Minn., Ohio, Pa., S. Dak., Tex., Va. 25th, Ky., Md., Minn., N. Dak., Pa., S. Dak., Tex., Va., W. Va. 26th, Colo., Kans., Mich., Wis. 27th, Iowa, Minn., Nebr., Nev., N. Y., Utah. 28th, Colo., Conn., Mass., Minn., Nebr., Nev., N. H., R. I., Vt. 29th, Colo., Iowa, Nebr., N. Dak., Oregon, Wash., Wis. 30th, Ind., Iowa, Kans., Md., Mich., Mo., Nebr., Ohio, Oregon, Pa., Va., Wash., Wis. 31st, Ark., Cal., Mo., Mont., Oregon, Va., Wyo.

SLEET.

Sleet was reported as follows: 4th, Colo., Iowa, Minn. 5th, N. Y., S. Dak. 6th, Ill., Mich., S. Dak. 7th, Ohio, Tenn. 9th, S. Dak. 11th, Nev. 12th, Colo., S. Dak. 14th, Minn., Wis. 15th, S. Dak., Wis. 20th, Pa. 21st, S. Dak. 31st, Ohio.

WINDS.

The prevailing winds during May, 1890, are shown on chart ii by arrows flying with the wind. In New England, the south Atlantic states, the upper Mississippi valley, and on the southeastern slope of the Rocky Mountains the winds were mostly from south to southwest; in Florida and the east and west Gulf states, from south to east; in the middle Atlantic states and the Ohio Valley and Tennessee, from southeast to southwest; in the Rio Grande Valley, from the southeast; in the lower lake region, from west to southwest; in the extreme northwest, from north to northwest; on the northeastern slope of the Rocky Mountains, over the northern plateau region, and along the middle Pacific coast, from northwest to southwest; on the middle-eastern slope of the Rocky Mountains from north to east; over the southern plateau region from south to west; over the middle plateau region from north to west; on the north Pacific coast, variable in Washington, and from west to northwest in Oregon; along the south Pacific coast from west to northwest; and in the upper lake region and the Missouri Valley, variable.

HIGH WINDS (in miles per hour).

Wind velocities of fifty miles, or more, per hour were reported at regular stations of the Signal Service as follows: 2d, 50, n., at Huron, S. Dak. 3d, 52, nw., at Fort McKinney, Wyo. 8th, 50, sw., at Dodge City, Kans. 10th, 59, ne., at Chicago, Ill. 12th, 52, n., at Fort Sully, S. Dak. 20th, 51, sw., at Dodge City, Kans. 24th, 55, sw., at Chicago, Ill.; 51, n., at San Antonio, Tex. 25th, 60, nw., at Bismarck, N. Dak.; 54, nw., at Corpus Christi, Tex. 27th, 54, n., at Fort McKinney, Wyo. 28th, 54, s., at Yankton, S. Dak.; 54, nw., at Fort Buford, N. Dak.; 50, sw., at Dodge City, Kans. 29th, 60, ne., at Nantucket, Mass.

LOCAL STORMS.

On the 1st a tornado, accompanied by rain and hail, passed southeastward over the northeastern part of McCulloch county, Texas, its path being about one hundred and fifty yards wide and several miles in length; the storm passed through an uninhabited part of the country, save where it struck and demolished a settlement of five houses, and levelled everything in its track. On the 3d a heavy storm caused a great amount of damage in De Soto county, Louisiana; a storm moving from the northwest, and attended by thunder, heavy rain, and some hail, struck Mesquite, Tex., about noon; the storm was fearful in its intensity for about one-half hour, and a great many buildings were blown down or damaged; excessively heavy rain occurred in Alabama, Mississippi, and southern Illinois, and heavy rain on the south Atlantic coast. On the 4th a violent wind storm occurred in Hood and Parker counties, Texas, killing several persons, and heavy hail damaged crops in Freestone and Young counties, Texas. On the 5th hail of unusual size began falling at Roseburgh, Oregon, at 8.21 p. m., and continued to fall for nine minutes; the hailstones were from three-eighths to one-half inch in diameter and of a conical shape, some being more spherical than others, and some quite flattened; the hail storm was confined to the vicinity of Roseburgh and to the country lying north, northeast, and southeast of that city, and damaged young corn; a hail storm, moving east, passed over Camp Peña Colorado, Tex., accompanied by high wind, and lasted twenty-five minutes; hail fell to a depth of six inches, and some of the hailstones measured one and one-half inch in circumference; a heavy wind and rain storm occurred at Natchez, and a violent wind storm at Jackson, Miss.; heavy electrical and rain storms prevailed in New York, New Jersey, Massachusetts, and Connecticut. On the 6th heavy electrical and rain storms occurred in Pennsylvania, Maryland, and West Virginia; and terrific electrical, rain, and wind storms were reported as having prevailed in Iowa for four days. On the 9th heavy storms were reported in Iowa, northern Missouri, and in Wilson county, Kansas. On the 10th a tornado occurred at York, Ohio, at about 4 p. m., causing considerable damage to buildings, etc.; a tornado visited Archer township, Harrison county, in the afternoon, uprooting trees, etc.

A tornado occurred at Akron, Summit Co., Ohio, on the 10th, concerning which Prof. Edward W. Claypole, of Buchtel College, Akron, Ohio, has made the following report: "A funnel-shaped cloud, moving toward northeast by east, or between that point and east-northeast, passed over Akron from 5.24 to 5.27 p. m. (local time), or 4.51 to 4.54 p. m. (central time), its track having an average width of about three hundred feet. The storm approached with thunder and lightning, but no flash was observed within a mile of where I stood. Heavy rain fell within